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THE WORK OF THE DEPARTMENTS OF BIOLOGY AND MEDICINE
OF THE HUNGARIAN ACADEMY OF SCIENCES

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A Magyar Tudomány Tíz Eve
1945-1955 /Ten Years of
Science in Hungary 1945-1955/,
1955, Budapest, Pages 183-198

A review of the work and development of the Biological and Medical Department (Department Five) of the Hungarian Academy of Sciences on the occasion of the tenth anniversary of Liberation and comparison of the present status of medical science with the status prior to the liberation reveals that this field has undergone great development. Hungarian medical students had always been avidly interested in scientific research work and large numbers of medical students strove to become research workers. With the further pursuance of their studies, however, their enthusiasm for research work faded when they discovered that instead of gaining esteem, the lot of the scientist was that of hunger and hardships. The Fascist period following World War I was particularly unfavorable to the development of all fields of science in Hungary, including medicine and the other natural sciences. The Fascist regime lacked proper esteem for science. This regime particularly hindered the development of the advancing fields of science, and caused the wasting of scientific talent and the death of many valuable scientists. Despite these adverse circumstances through heroic efforts the level of medical science in Hungary was preserved for the period of socialist construction. However, the work of Hungarian scientists and the development of an independent medical science in Hungary was conducted under very difficult circumstances.

Official measures, such as those which prevented Hungarian medical students from taking courses in biology, and those which prevented materialist biologists from giving university lectures also served to stifle development of the fields of medicine and biology. Despite many attacks on his teachings, Professor Huzella defied the government by continuing to teach general biology even though official documents were signed to prevent him from doing so. It is no wonder, then, that the study of biology was neglected. The consequences of this neglect are still strongly felt today. Naturally, planned scientific work was impossible during these decades. Science was forced to exist on the few pennies allotted to it by big capital. Entire fields of research were relegated to the background. The Hungarian Council on Natural Science, which was founded in 1926, drew up a broad plan for a program of development of the natural sciences, but due to an acute lack of funds in proportion to the scope of the developmental plan, the program was not executed.

Despite all the measures tending to suppress the development of industry, scientific research could not be entirely dispensed with, and capitalistic society was forced to support a certain amount of scientific experimentation. This resulted in the formation of the Szechenyi Scientific Society which was backed by Hungarian capital. The 26 June 1936 meeting of this society illustrates the kind of backing it received. According to the financial report, during the 9 years preceding 1935, a total of 753,320 pengos was spent on research in the natural sciences. Of this total 171,620 pengoes was allotted to medical science. The greatest annual sum devoted to scientific research was 203,000 pengos in 1930 which, however, dropped to 63,000 pengos in 1936. Of this financial backing the secretary of the society declared that "the Szechenyi Scientific Society has been able to extend greater financial aid to scientific research than that afforded by the National Scientific Council,

and the opinion frequently has been expressed in scientific circles that the majority of research achievements attained during the past decade may be attributed to the support of the Szechenyi Society."

The greatest task in the field of recommencement of medical research following Liberation was the evaluation of research workers and the development of research work sites and research work opportunities. During this period it is understandable that the problems of the universities, of academic departments, and staff training problems all were interwoven, and research and education were beset by great difficulties. Instruction was begun at the universities in 1945, or as early as December 1944. The Free Professional Union of Hungarian Doctors was formed, with sub groups pertaining to professional researchers. From this time on all the greater university centers held regular meetings and congresses in all branches of medical science. This was essentially a beginning period, and was concerned chiefly with clearing away the ruins so that the new work could begin. Many new industrial plant and research laboratories were opened under the slogan "workers for the scientists, and scientists for the workers." Many new academic departments were founded during this period. There was great need for reorganization of the affairs of academic departments because, especially in the provincial universities, many combined academic departments had been carried over from the past in some of which, for example, the same professor taught anatomy, histology, embryology, pathological anatomy and forensic medicine. The capable young men in the field were leaving research in the clinics and the theoretical institutes in the search of better earning jobs.

The chief aim of the post-liberation period was to inspire more men to undertake research work. The Hungarian Scientific Council was founded in 1949 for the achievement of the latter goal, and this council undertook the reorganization of science in Hungary. The council extended great material aid to the research workers and to the organization of further development of research projects. The aid of the council also enabled expansion of the basic equipment of individual institutes. The Scientific Council has aided in the construction or equipment of Hungary's all scientific institutes. The work of the Scientific Council, however, was not limited to material aid. The Medical Science Section of the Department of Biology of Scientific Council undertook study of the status of medical science research in Hungary. Following the conclusion of the pioneering work of the Scientific Council its work was carried on by the Hungarian Academy of Sciences. The Hungarian Academy of Sciences was reorganized in 1949, and this reorganization marked the beginning of the adaptation of scientific work to the construction of socialism.

The construction of socialism necessarily requires that the development of science proceed with ever-increasing intensity and an increasingly wide basis, drawing its personnel from all levels of society. The construction of socialism demands that the transformation of social structure be accompanied by modification of the methods and aims of scientific research. Socialist medical science could not be created overnight, especially in view of the numerous difficulties which arose in respect to the work of the new academy. One of these difficulties was the acceptance of the fact that the orientation of scientific research depends upon the world outlook of the researchers, which effects their research aims. The deliberate introduction of dialectic materialism into scientific work required a great deal of thought and effort. Hungarian researchers did not readily perceive that the program of scientific research could and should be planned, and that the only successful way is through well-laid plans. They had to realize that the success or failure of the planning determines the success or failure of that type of perspective research work which takes its orientation from dialectic materialism.



Both the Scientific Council and later, the academy, wanted to support all branches of medical science research when the former organizations began functioning. In addition to improving the qualitative level of research work, these organizations also strove to introduce the proper ideological viewpoint into research projects. They require that the planning of the various research projects have an immediate, or at least an indirect, connection with the plans and aims of the people's economy, and thereby serve the construction of the socialist state and the raising of the level of existence of the working class. The effects of Soviet biological and medical science achievements also had to be made felt in Hungary's domestic research in order to remodel Hungary's science to conform to the needs of socialist science.

The renovated Academy of Sciences also contained an independent medical department, which fact gave an added significance to the Hungarian Academy of Sciences. With few exceptions, the scientific academies of other countries lack a medical department and medical research scientists work as academicians in the department of biology. This fact gave rise to several special problems in the field of activity of the medical department, which were further complicated by the characteristic peculiar to medical science that the final goal of medical science is the curing of the sick, and consequently the aim of an outstanding scientist in this field often was equated with outstanding performance as a doctor.

Between 1949 and 1953 the fifth department functioned as the Department of Medical Science, and in 1953 was changed into the Department of Biology and Medical Science, with the addition of several members of the former Department of Biology. Not all technical branches are represented within the fifth department, but then the Academy is not a representative organ. The largest group within this department is composed of the internal medicine specialists Istvan Rusznyak, Geza Hetenyi, Imre Haynal, and Pal Gomori. These academicians represent the old Hungarian school of internal medicine, principally the school of Sandor Koranyi. The method of conducting research on diseases by experimental means and testing the results in the actual treatment of patients first was developed by this school, and this method owes its success to this school. The field of pediatrics is fairly well represented by Pal Gegesi Kiss, Geza Petenyi and Odon Kerpel-Fronius, which attests to the great success of Hungarian pediatric methods. Unfortunately surgeons are not represented in this department. The field of urology is represented by Antal Babics, who is an outstanding exponent of the Illyes school. The field of physiology is represented by Jeno Ernst and Bruno Straub, the heirs of Hungarian muscle research. The latter, with Imre Szorenyi, are the chief representatives of biochemistry in Hungary. In the field of nervous system research, Karoly Schaffer has founded a new school of thought, Janos Szentagothai is founding a new school of thought in experimental morphology, and Istvan Kornyei is extending the Schaffer school of thought into theoretical and clinical brain research. Kalman Lissak is the leading expert in research on nerve physiology, and Isvan Went represents the field of classical physiology. The field of pharmacological research is represented by Bela Issekutz, chemotherapy by Miklos Jancso, virus research by Gyorgy Ivanovics, experimental histology and embryology by Imre Toro, cancer research by Bela Kellner, and dermatology by Odon Rajka. Ambrus Abraham, who is investigating the peripheral nervous system by the classical methods, joined the fifth department from the Department of Biology in 1953, as did Rezso Maucha, who founded the study of hydrobiology in Hungary. During the past 10 years the Department suffered great loss through the deaths of Geza Illyes, Nandor Gimesi, Raymund Rapaics and Andras Havas. Geza Illyes, founder of the Hungarian school of urology, was the first president of the fifth department of



the renovated Academy of Sciences. Gimesi was noted for his study of plant physiology, and his death has all but obliterated this field of study in Hungary. The death of Rapaics had a similar effect on the field of history of science, and his place has not been filled. The death of Andras Havas has left the field of the science of hygienics without a leader. This man was irreplaceable because he founded this entirely new field of science under the socialist system.

Since its merger, the Department has undergone several minor re-organizations. At present the work of the Department is accomplished through the main committees and the various specialty subcommittees under the latter. The subcommittees direct the so-called research theme committees, which assist and control work on the research themes designated by the academy. Both young and old researchers working on any particular research theme take equal part in these committees.

According to the work method which has evolved over the course of the years the Academy designated the research themes which it wished to be developed, and from these the research workers of the various research institutes picked the problems they wanted. Another factor which contributed to the development of this work method was the founding of the Scientific Council of the Ministry of Health in 1952, one of the tasks of which is the support of scientific work. Apportionment of the research themes between the academy and the ministry was not easily resolved. This difficulty was further aggravated by the fact that research work was being done for both the Academy of Science and the Ministry of Health by the same researchers, working within the same academic departments. The specialty committees of the Scientific Council also employ a great many of the same specialists as are employed by the main committees, and this double load often is a superfluous burden on the research workers. This problem still has not been completely solved, although much has been accomplished towards a solution by cooperation of the academy and the ministry, and the success of both of these agencies has been aided by the work of a 6-member coordinating committee, consisting of personnel of the Ministry of Health. It appears that this committee will gradually effect a solution to the above problem.

The task to be fulfilled by the Hungarian Academy of Sciences is the supervision and direction of all scientific activity in Hungary. The fifth department of the academy is not equal to this task because the academy has no medical research institutes. Medical research is done at various academic departments, and the academic departments are not under the supervision of the Academy of Sciences. Also, due to the concentration on the introduction of new instructional methods and the organization of the new educational system the demands and considerations of research work have been relegated to the background. The Ministry of Health primarily emphasized the demands of education and therapeutic work, and the organizational work and resolutions of the Ministry have been directed toward this end. The problem of conducting research work was left to the Academy of Sciences, and the academy, because it lacked research institutes of its own, had to depend on the academic departments. Because of their instructional and therapeutic tasks the academic departments cannot devote sufficient time to research work. Investigations requiring modern, extensive equipment, such as electron microscopes, the use of radioactive isotopes, or Pavlovian physiological research, cannot be performed by the academic departments. Throughout the scientific world the trend is toward the formation of research institutes for the development of research work. Adequate conduct of scientific research requires that the work in the various fields of specialized research be controlled on a national scale by individual leading institutes. Such institutes may also serve in the role of determining the qualification of



research specialists. In addition to a lack of material means during the past 10 years, the organization of such research institutes was hindered primarily by a lack of staff personnel. For this very reason the Academy of Sciences found the time not ripe for the establishment of a network of research institutes, because the formation of such institutes would have greatly weakened the staffing of the academic departments. Unfortunately the Ministry of Health failed to take this into consideration and went ahead with the formation of many research institutes, which were joined to existing hospital wards. The institutes which were formed in this manner included the Sport Medical, Tuberculosis, Oncological, Balneological, Rheumatism Research Institutes, and others. These research institutes do some of the routine work of the hospital wards, but are quite small compared to the hospital wards which have great tasks to perform, and must be content with handling smaller tasks which fall to them from the latter. This is not a healthy trend in development, especially since these primitive tasks divert entire cadres, occasionally involving quite outstanding personnel, from a healthier trend in future development ensuring increasing growth of a well-founded system of research institutes. The theory of the Academy of Sciences is that an increasing number of research institutes could be founded in Hungary through the increased training of research cadres. This theory was behind the 1953 resolution for the founding of an experimental medical research institute. The execution of this resolution was begun through the formation of an academy unit consisting of one or 2 researchers and one or 2 research assistants at each of 4 academic departments. The Academy intends to increase the number of these units from year to year in proportion to existing possibilities, so that when the institute buildings are completed these well trained and already equipped units could move right into the new institute without weakening the academic departments through their departure. Hungarian medical science cannot deal with every branch of study with the same intensity of effort. Individual fields of study must be selected in keeping with the resources and needs of medical science, which can be developed through organized work, increasing training of personnel, acquisition of experience and equipment, until the time when individual research institutes can be built in the selected fields. It is especially important that worthy and experienced leading research workers be available in these fields. Without such leaders all efforts will be only primitive attempts.

A significant change took place in the existence of the fifth department in 1953 with its reorganization as the Department of Biology and Medical Science.

Medical science deals with man as a biological entity, and thus is a part of the science of biology. Beyond a doubt the results of biological research are the starting points for medical science research, and the major biological problems such as research on embryology, heredity, reproduction, inflammation, infection, parasitism, symbiosis and tumors all serve the development of medical science. These research problems are the major contributors to the development of medical science.

As was mentioned above, biology was a relatively neglected field of science in Hungary, and various outstanding Hungarian medical scientists themselves conducted biological research which so successfully served as the basis for further medical research in Hungary. This is how it came to be that experimental biology was carried in the midst of medical research, and Hungarian biologists limited themselves to achievements in the field of taxonomy and related field of zoology and botany, leaving experimental biology almost entirely to the medical men.

When, in the course of founding a socialist medical science the new Academy of Sciences began to study and apply the Soviet results in this field, it became apparent that the experimental field was an orphan in Hungarian biology, and the speeding of the development in the field of experimental work depended upon medical researchers. For this reason in 1953 the medical department was allotted the task of developing the field of experimental biology, and the medical department was reorganized as the Department of Biology and Medical Science.

Hungarian medical science also was lacking, in addition to experimental ontogeny, in research in genetics, plant physiology, experimental histology, and comparative physiology, comparative embryology and comparative anatomy.

The lack of research in these fields was particularly felt when in the course of studying Michurin biology, the application of the problems of acellular living matter and the dialectic materialism of Pavlovian teachings in the field of biology became the focus of attention. It became clear that in actual fact the cell nuclei and chromosomes are not the sole factors in heredity, but the entire cell has a role in determining heredity. It also became clear that in addition to the spermatozoa, all cells of an organism effect the formation of the spermatazoa, and thus effect the formation of heredity factors, and that the relationship of the organism to the environment and cell metabolism have crucial importance in the perpetuation of the species. It became clear that all these problems could be pursued in research only if this research is founded on a broad basis of experimental biology. The possibility of inheritance of acquired characteristics refuted the Weismanian theory of immortality of germ plasm and the conservation of living matter. Closely connected with the foregoing were the results of investigations which poked holes in the theory of the absolute quality of cell pathology and which proved that the living organism consists of acellular living matter as well as cellular matter, and that the former act as the origin of new cells. This discovery placed emphasis on research on living protein matter, and on protein research in general, and also revealed that new cell nuclei can come into being without the mediation of the parent cell. Thus cells may be reproduced not only from other cells, or cell nuclei may be produced not only from other cell nuclei, but both can be formed anew, and the internal and external environment of the organism both may have an equal effect on this new formation. The dialectic materialism had the same leading role in all these fields of research as it did in the great works of Pavlov, which focused attention on the activity of the central nervous system.

The 1950 USSR Pavlov conference attracted attention to the importance of the Pavlovian point of view and of the conditioned reflex method. The organism receives and reacts to internal and external stimuli through the nervous system, which is the connection which fuses the living organism with its environment. This is further confirmation for the hypothesis of Michurin biology. The study of this problem has been limited to the repetition of one or 2 Pavlovian experiments. During the past 10 years there has been considerable advancement in this field, too. The conditioned reflex method was more extensively used at the Pecs Institute of Physiology, where Pavlovian laboratories were set up and investigations on electrophysiology were successfully performed with the use of the Pavlovian methods. The conditioned reflex method and the Pavlovian point of view were studied and adapted at the Budapest Institute of Physiology, the Budapest Psychological and Nerve Clinic, the Budapest Institute of Pathology and many other institutions. The Medical Science Document Center had an extraordinarily great role in the spreading of the Pavlovian outlook through its publications and through its active translation service.



In 1953 the Presidium of the Hungarian Academy of Sciences, in recognition of the great significance of the Pavlovian point of view and the Pavlovian methodology, created the Pavlov Committee to work alongside the Presidium for the dissemination and fortification of the Pavlovian viewpoint and methods. The research projects continue and further develop Sandor Koranyi's work on functional pathology through investigation of the importance of the central nervous system in the origin of internal diseases. Significant results already have been achieved in this field in the study of gastric ulcer and the so-called vegetative ailments.

The greatest single aid in this field was extended by the visits of Soviet scientists and the work of Soviet advisors in Hungary. The visits of Voronin, Kupalov, Koshtoyants and others, and half-year work in Hungary of Professors Tatarenko and Makarichev formed the basis of the application of the classical Pavlovian methods in the fields of psychiatry and physiology. Well equipped Pavlov laboratories were created at the Budapest Psychological and Nerve Clinic and at the Budapest Institute of Physiology which, together with the Pecs Institute of Physiology will constitute the center of further research in these fields. The fifth department considers dissemination of the nervism theory in the theoretical branches of science and in medical practice to be an important task.

Conditioned reflexes established by the conditioning effects of the environment of living organisms developed the various species in the course of Darwinian evolution through species and individual ontology. These species are in constant change resulting from control of conditioned reflexes by the environment, which effects their adaptation to the environment.

With the aid of his extremely well developed cerebral cortex man is capable of extremely complex higher nervous activity which, through the influence, strengthening or weakening, of various conditioned reflexes has enabled man to develop the faculty of speech and thus to become a social, as well as biological animal, with special biological characteristics. The Pavlovian teachings treat human physiology and pathological changes in the light of the above viewpoints, attributing great importance to the modification of environment through so-called preventive medical research. These teachings treat the organism as an essential whole and in addition to therapy, they emphasize primarily prevention of disease. Once a disease is present, however, instead of examination the affection of the individual organs they treat every disease as an affliction of the entire organism as a whole. For example, there is no such thing as pulmonary tuberculosis, but only tubercular organisms in which the lungs are primarily affected.

All these teachings have greatly emphasized the lack of experimental biology in Hungarian natural science. It now has become evident that the past has left neither a scientific heritage nor even interest in general biology in Hungary. The construction of socialism in Hungary, selective animal breeding and plant improvement and even research on the basic laws effecting medical science is possible only with the development of experimental biology. The lack of emphasis on Darwinian principles and failure to recognize the importance of evolutionary principles precluded the possibility of development of the comparative natural sciences. These defects could not be remedied overnight, and the difficulties of the training of qualified cadres are especially felt in this field.



In the field of plant physiology Hungary has been aided by Professor Potapov who further developed the works of Professor Huzella at his department of plant physiology and at the Alsogodi Biological Station, thus creating a basis for the further development of experimental botany in Hungary. The work of Professor Potapov has enabled the laying of the scientific foundation of plant improvement in Hungary. A similar preparation for the laying of a scientific foundation for improving domestic animal species is lacking. The development in this field in Hungary is extremely poor. Practically no one is presently engaged in study of invertebrates, and the simplest systematic understanding and development of this field would be through preliminary study of invertebrates.

In the field of genetics research on plant genetics is relatively more advanced in Hungary. Young researchers have avoided the field of genetics. These young scientists were frightened away from this field by the dogmatism of mostly semi-qualified persons who wanted to force them to accept the findings of individual Soviet publications which filtered through to Hungary. Therefore, in 1953 there was a lack of trained cadres in this field, also.

Hungary is strong in the field of hydrobiology, partly because of the Tihany Research Institute, and partly because of a very good technical cadre in the person of academicians Maucha.

Cancer research also has undergone considerable change in Hungary since Liberation. Cancer research in Hungary is concerned not only with description of the peculiarities of the various types of tumors, but Hungarian researchers are chiefly interested in the metabolism of tumorous tissue, the origin of tumor cells and the origin of tumor migration. Tumor research is directed by a special committee of the Academy of Sciences, and this committee also is concerned with the national cancer survey and utilizes the results of the latter in its scientific work. The rapid development of defense against cancer was advantageous to cancer research. The radiation biology and oncopathological research work of the Institute of Oncology also will greatly aid the fight for control of cancer. The investigation of the carcinogenic effect of various substances also has been expanded. Domestic research in oncology and the defense against cancer have been developing under favorable circumstances and important achievements which compare favorably with those of other countries have been attained, especially in the latter field.

In the field of general biology, research has already begun in Hungary on histology, experimental embryology, geriatrics, proteins and heredity. Three institutes under the Fifth Department are functioning in the field of biological research: the Tihany Biological Institute, the Institute of Biochemistry and the Institute of Genetics. In addition to these institutes, important research is being done at the various biological academic chairs. The Tihany Biological Institute came under the Fifth Department in 1953 when the Department was assigned the task of the organization of experimental biology. The Tihany Biological Institute is not a new institution and has changed its focus of research rather frequently, and thus is having difficulty in deciding on the aspect of research which would be the most suitable for the institute's facilities, circumstances, capabilities, and the needs of Hungarian biology. In the present instance the needs of experimental biology were given consideration in the reorganization of the institute. The Tihany Biological Institute has three departments. The Department of Hydrobiology is concerned with the problems of the so-called productive biology of Lake Balaton. In addition to studying the physical chemistry of the water, the plant and animal organisms of the biological community are being

studied from the point of view of improving the fish balance of Lake Balaton. The Experimental Zoology Section is investigating the heredity of quantitative characteristics. Through performing metabolic studies on wild and domesticated rabbits and their hybrids this section has developed several new improved types for the benefit of large scale breeding farms. The Experimental Botany Section is engaged partly in experimentation on the production of vegetative hybrids of tomatoes and partly on investigation of the ability of foliage to withstand conditions of low atmospheric moisture. The further development of the Institute is now under way.

The Institute of Biochemistry is another Academic institute which is under the Fifth Department. The principal research aim of this institute is fundamental protein research. This institute had a slow start because due to illness it was at first without a leader for a long period of time, and later the institute had no suitable location and until comparatively recently the institute was temporarily housed in several sites of the OKI.

The Institute of Genetics also was acquired by the Fifth Department through the acquisition of control by the latter of all experimental biological research. This institute previously functioned as an agricultural biology institute and it was renamed the Institute of Genetics by the Fifth Department in conformance with its task and research theme. In the interest of development of genetics research in Hungary it is absolutely necessary that this institute be enlarged with the addition of a department of animal genetics. At present the Institute is primarily concerned with plant genetics, vegetative hybridization and the changes in the biochemistry of hybrids.

During the past 10 years there has been considerable advancement in experimental work in the field of theoretical medical science. The Fifth Department has achieved its best results in this field. The functional viewpoint and the theory of the unity of the living organism has resulted in great advances in research in anatomical histology and ontology. Considerable achievements have been attained in the field of nerve tissue research in respect to cell reproduction and regeneration. Lively debate, which is vital to the development of any field of study, has been in abundance in field. The debate of professors Apathy and Lenhossek, which took place at the turn of the century, concerning the continuity, or contiguity of nerve cells still has not subsided. Several research projects ingeniously combined the classical morphological methods with experimental and physiological methods and produced excellent results in research on nerve pathways and on nerve regeneration and nervous regulation. The classical investigation methods are constantly being replaced by experimental methods which although having greater material demands, ensure practical utilization of the theoretical research results.

Research on bone regeneration is being carried on in the field of surgical traumatology, but in addition to investigating the basic laws governing this phenomenon almost every research project is directed at perfecting therapeutic methods. New prospects have been opened in the field of cell research by the discovery of a new form of cell reproduction in the glands of fetuses, taking into consideration the origin of the cells of fetal glands and the origin of their nuclei independent of the nuclei of the cells of the mother. This matter opens new possibilities in the research on hematopoiesis. Many research projects were devoted to the study of arteriosclerosis and the surgical diagnosis of high blood pressure. Research in these fields led to the discovery of a new enzyme, elastase. Biochemical investigations also have been emphasizing functional aspects, with research on the specificity of proteins and



biochemical changes in the course of vital activity. The aim of these studies is to achieve a greater understanding of vital processes and to be able to influence these processes. Muscle research also continues to advance in Hungary from year to year. With the support of the Academy of Science, research on tumorous illnesses also is being carried on at a great pace. The more demanding experimental methods are gradually replacing the classical research methods. The former have yielded good results in study of nervous regulation of hormone production, of the influence of hormones on bone regeneration, in the origin of cells and in the development of tissue. In the field of morphology, with the support of the Academy of Science excellent results have been achieved in the fields of arteriosclerosis, the surgical causes of high blood pressure and in the study of connective tissue changes in pathological tissue, and research on these problems is being carried on at a great pace.

Very good results could be achieved in research on medicines and antibiotics according to the outstanding personnel working in that field. Despite such excellent personnel, however, the desired results have not been attained. This is due to many organizational faults, however, and not to the personnel themselves. Hungarian scientists have developed the necessary methods for research and production of antibiotics, which have enabled Hungary to build up a considerable export trade. This field could be further developed and greater imports would be possible if antibiotics research were financed by the income derived from the export of antibiotics and did not have to depend solely on the several ten thousand forints which the Academy of Science now can devote to this field. Only the combined efforts of several institutes can alleviate the above difficulties.

Hungarian medical science has a rich heritage of achievements, but some branches of medical science have no historical past in Hungary and have been founded only in connection with socialist construction in Hungary. With socialist construction the field of the science of hygienics came to Hungary, which was originally developed in the Soviet Union as a result of the entirely new problems posed by the new large construction projects, such as the construction of water works and the building of new industrial cities. In addition to solution of the problems of labor hygiene and food hygiene, the aims of science include solution of the new problems of community and climatological hygiene, the building of the new Socialist village, and solution of new problems of agricultural hygiene. These scientific problems require the attention of other specialists, in addition to doctors. The Food Hygiene Committee consists of agricultural scientists, chemists and medical specialists. The Committee on Silicosis has a similar staff, and is concerned with the therapy and prevention of pulmonary diseases caused by the various types of mineral dust which are encountered by miners and glass makers.

Virology, which is one of the most important fields of the development of microbiology in Hungary, has reached important proportions as a field of study only since the Liberation. Excellent results have been achieved especially in the fields of virus reproduction and microbiology. The recently deceased Academician Andras Havas had a great influence in broadening the scientific basis of domestic virus research through the founding of many research laboratories with the aim of providing a broader basis for microbiological research in Hungary.

During recent years extensive research has been done on bacteria which cause various types of intestinal diseases. Very successful work has been done primarily on the Coli species which cause dyspepsia, and in the field of epidemiology, important work has been done on dysentery. Now, effective preventive measures may be taken against the previously



inexplicable hospital epidemics which now are known to be caused by pathogenic Coli species. At present extensive investigations are being conducted on the development of preventive inoculations for dysentery.

Microbiology is one of the fields in which medical, agricultural and chemical research scientists work together and have formed a common society, the Hungarian Microbiological Society.

The fact that circulatory diseases are second only to tumorous diseases in fatality rate caused the Academy of Sciences to focus attention on the former research theme. Many researchers have done work on the heart, arteries, hematopoietic organs and on diseases of the kidney during the past 10 years. The inspiring work of Sandor Koranyi in the field of kidney research has attracted many scientists to pursue this problem. Many aspects of kidney function still remain unclarified. The relationship of nutrition and of hormones to the secretion of urine, and the laws governing urine filtration still are very interesting problems. The relationship between the nervous system and the regulation and functioning of the kidney is an extremely interesting problem.

Surgery also has undergone considerable development in Hungary since Liberation. The methods without which modern surgery is impossible have successfully been introduced. This modernization process is due mainly to the activity of professor Petrovskiy, who spent 2 years in Hungary as the director of the Third Surgical Clinic, and whose work in Hungary has left a deep impression on the practical and scientific advance of Hungarian surgery. The founding of the National Blood Bank Service, as well as its organizational and operational methods, resulted in far-reaching modernization of both general and emergency surgery in Hungary.

The pulmonary surgical procedures developed by professor Sebestyen and his school also have developed further during the past 10 years. The school of pulmonary surgery which was founded by professor Sebestyen has continued to advance after the death of the founder and has acquired international fame. In the field of surgery the most rapid and successful advances have been made in those branches of surgery which previously had not been in existence in Hungary. Nerve surgery has been developed in Hungary, as well as surgery of the esophagus, which is one of the practical results of the work of professor Petrovskiy. Great many heart operations may now be performed in Hungary which previously were impossible due to lack of surgical skill and equipment.

The greatest achievement in the field of nerve surgery is the founding of the Institute of Brain and Nerve Surgery, at which institute large numbers of brain and nerve operations may be successfully performed. This institute may become a leading arm of this field of science.

A constantly increasing number of scientists are coming to recognize the decisive role of the central nervous system and this viewpoint is gaining increasing dominance in research projects. The field of nerve research also has a considerable heritage in Hungarian science upon which it may draw.

The teachings of Pavlov, which give scientific expression of the so-called "nervous states" in connection with various organs and enable research to be done on these states further increase the importance of investigation of the nervous system and of higher nervous activity in the research program of the Academy of Sciences. Accurate methods have been developed for the damaging of isolated brain centers for the purpose of studying the effect produced on vegetative metabolism, the circulation

of hormones, etc. This method has become extremely widespread and has been adopted by many institutes for the solution of their research problems.

A considerable amount of research has been done on the morphology and physiology of circulation. An exceptionally significant initiation in this field is the research on lymph circulation, which except for theoretical research had been completely overlooked in clinical investigation. In the course of this research it was found that in addition to the crucial role of disturbances in lymphatic circulation in the origin of various types of edema it also was successfully proved that insufficiencies in lymphatic circulation have a very important role in the diseases of many internal organs. Similar investigations are being conducted on normal and pathological renal lymphatic circulation.

In addition to the excellent research on lymphatic circulation, good results have been obtained at many research points on the clarification of various details of the problem of blood circulation. In the course of investigation of the shock effect of loss of blood it was demonstrated that the kidney-damaging effects of loss of tonus under narcosis can be avoided.

The great heritage and the excellent results of Hungarian research on nerve morphology, the heritage and rapid development of domestic research on circulation and the rapid development of the field of surgery may be a great influence in the further development of the theoretical and clinical branches of nervous system and circulatory research. One of the principal tasks of the Fifth Department of the Hungarian Academy of Sciences is the direction and support of this excellent and entirely continuous developmental trend.

During the past years there has been considerable debate as to whether the Academy of Sciences is extending sufficient support to the so-called clinical sciences, and even as to whether there is such a thing as a clinical science. It was often charged that the academy considers only laboratory, or animal experiments to be scientific undertakings. This debate now is a thing of the past, because it has become generally accepted that the Academy of Sciences must support all forward-looking scientific undertakings. All scientific observations which begin at the patient's bed are utilized by modern laboratory and animal experimenters in the solution of basic underlying problems and the experience and knowledge gained in this way are again applied to the therapy of patients suffering from various kinds of diseases.

The unity of theory and practice, which is one of the basic laws of modern biology and medical science, thus can lead to successes in all endeavors of the Fifth Department.

This problem has been best solved by Hungary's internal medicine research specialists, but excellent results have been achieved in the field of pediatrics, also. Nearly all Hungary's outstanding pediatricians participated in the research on infantile atrophy and good results were obtained both in the study of infantile diseases and in the therapy of the diseases.

With the aim of developing well-trained cadres, the institution of the grade of aspirant was enacted, based on the Soviet educational system. This educational system permits more rapid and more thorough specialized training. The aspirant, or graduate student, may devote himself more thoroughly and uninterruptedly to his studies and can receive better assistance from the graduate student counselor. This educational system, however, still has not been completely assimilated and it will be some



time before the system is completely adapted to domestic conditions. The Fifth Department is constantly working at this problem, however, in order to assure rapid solution of any difficulties which may arise.

As of September 1954 the Fifth Department of the MTA [Magyar Tudományos Akadémia -- Hungarian Academy of Sciences] had on its rolls 2 scientists with the degree of doctor of biology, 15 with the degree of candidate in biology, and 24 with the degree of doctor of medical science and 210 with the degree of candidate in medical science.

Since the inception of the shortened academic qualification period system 93 applications have been received by the Fifth Department under the provisions of Paragraph 9. Of these the Academic Qualification Committee granted 43 degrees, rejected 8 applicants, and the rest are under consideration. Very few applications were submitted at first and the number of applications increased only in the latter half of 1953, after the first applicants were granted degrees.

Until the present time 51 dissertations were submitted on the basis of an official request, completion of the aspirant's requirements and on the basis of Paragraph 9. Of these the TMB [Tudományos Minosító Bizottság -- Academic Qualification Committee] rejected 4 candidate's and 3 doctor's dissertations; 3 doctor's dissertations and 9 candidate's dissertations were successfully defended. Two of the latter dissertations were successfully defended by students with the status of aspirant. The remaining dissertations were submitted partly on the basis of an official request and partly on the basis of Paragraph 9.

The training of scientists under the aspirant system covers very broad fields. Up to the present time 106 regular and 13 corresponding physician aspirants, and 3 regular biology aspirants have been working under the Fifth Department.

Twelve scientists have completed their aspirant requirements. Of these, 2 have already defended their dissertations and 4 others have submitted their dissertations.

The 2 scientific societies which are under the direction of the MTA play an important role in both the training of scientific personnel and in the scientific life of Hungary, in general. These are the Hungarian Biological Society, which has a great historical past, and the itinerant conference which is named after Sandor Koranyi. Each of these societies holds an annual meeting at one of the universities, which is presided over by a professor who is a specialist in some field. At the meetings of the MET [Magyar Elettani Társaság -- Hungarian Biological Society] experimental biological research, and especially physiological research pertaining to the field of Hungarian experimental medical science are discussed in the light of current problems under investigation. The other society is concerned chiefly with experimental work in the various clinical fields. Foreign scientists participate in the meetings of both societies, and practically all branches of Hungarian medical science are touched upon.

The Fifth Department of the Hungarian Academy of Sciences has done considerable work in the field of book publication. The publication of scientific books has increased greatly since Liberation, and especially during recent years. Up to the present time 30 medical and biological books have been published in the fields covered by the Fifth Department, 16 of which were by Hungarian authors and 14 were translated from Russian.

Many books are in preparation, most of which are monographs by Hungarian authors.



The Fifth Department also is expediting the publication of Pavlov's selected works. Many volumes of the latter already have appeared and the entire series will be completed within one or 2 years. The book entitled Elettani vizsgalo modszerek [Biological Investigation Methods], which is under the chief editorship of academician Bela Issekutz is a very important work and fills a gap in the literary support of scientific research.

Although the books published within the field covered by the Fifth Department embrace many fields of medical science and experimental biology, no adequate work has been published on the subject of several important problems. This is true especially of the field of experimental biology. Despite this fact, the publication of scientific books in Hungary has undergone great development. Many Hungarian monographs have been published, and all in all many more medical and biological books are being published than at any previous time.

The Medical Document Center of the Academy of Sciences has had a very great role in the dissemination of scientific literature. Through the translation of several thousand Soviet publications by the Medical Document Center, the publication of popularized documents and through its active translation service the Medical Document Center has done a great service in acquainting the Hungarian scientific community with the results achieved by Soviet medical science and biology.

The commencement of publication of medical and biological scientific periodicals was of very great importance. The Acta Medica, Acta Biologica, Acta Morphologica, Acta Physiologica, and Acta Microbiologica now review and publish the results of the most outstanding authors of Hungarian science. This is the first time that the publication of such periodicals was possible in the history of Hungarian medical science. As the experience of the past years has shown these Acta have developed rapidly into very high quality periodicals and are now read more and more in the Soviet Union, in the friendly states, and in the West. It always takes a long time for a new scientific periodical to develop to the point befitting their content, but it seems as though the Hungarian Acta series will complete this process within a relatively short time and will become worthy representatives of Hungarian medical science and biology.

During the past years the work of the Academy of Sciences has not been distributed evenly among the academicians and as a result some academicians were overburdened with work, while others were able to accomplish their assigned tasks in a relatively short time. One of the reasons for this was that the academicians did not feel that the Academy of Sciences really belonged to them, and that the various problems would be solved without their participation. Another reason for the above was the fact that at first the official apparatus of the academy tended to overemphasize its own importance. However, this situation is being gradually remedied, and it is hoped that the situation will continue to improve and that more and more reliance may be placed on the increased efforts of the academicians.

During the entire development described in the above Hungarian science was greatly aided by the possibility of some, though unfortunately not enough, Hungarian scientists' visiting the Soviet Union. The visiting Hungarian scientists were able to examine the Soviet research institutes and their work, and benefitted greatly by borrowing from the results achieved by Soviet science. The Hungarian scientists found a world entirely different from the one they had known before and their study of the Soviet methods had a great influence on Hungarian scientific life.



The road which has been travelled by Hungarian science was full of hindrances and difficulties. Many errors were made, and many difficulties remain to be overcome in the future. On the other hand, Hungarian science had set a great task for itself, and has already undergone a great transformation. The results which have been achieved may be evaluated only through comparison with the results obtained under capitalist Hungary. However, these years of struggle and strife are not the most favorable for the development of science. Only the bases for scientific development can be laid in the midst of such struggles. Only if the socialist science which is built on this foundation can work calmly and in peace in a socialist society, and if the scientific planning is not overshadowed by the clouds of war can all the possibilities which are offered by the socialist social system be realized. Only then can the immeasurable treasure which Hungary received 10 years ago from the Soviet Union together with her liberation be completely evaluated.

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